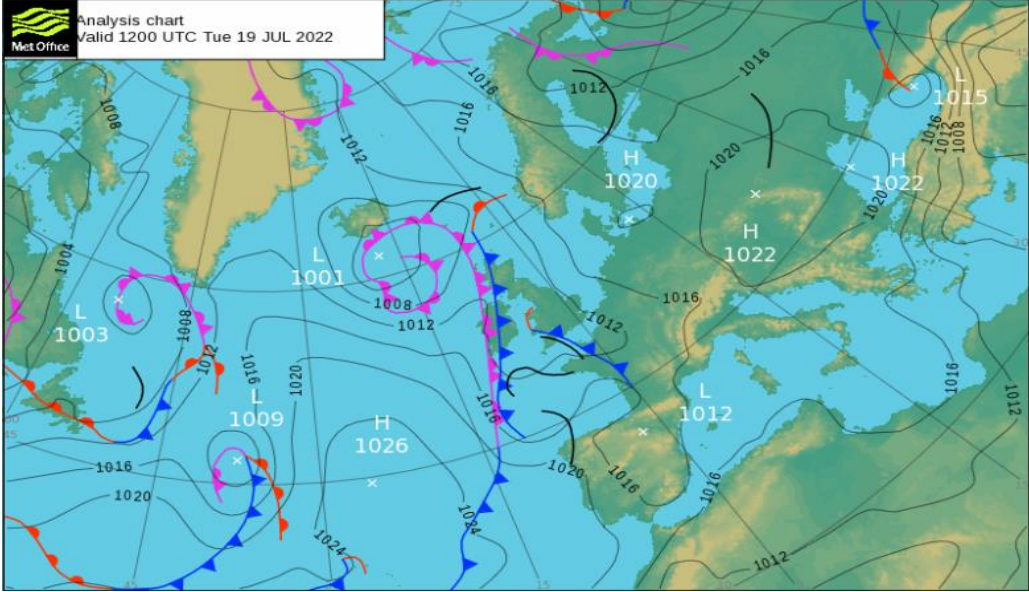
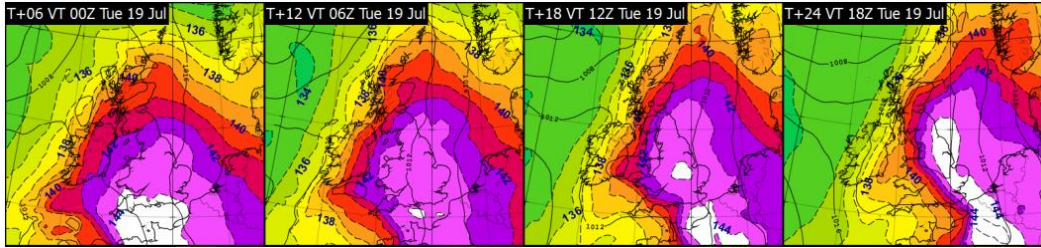


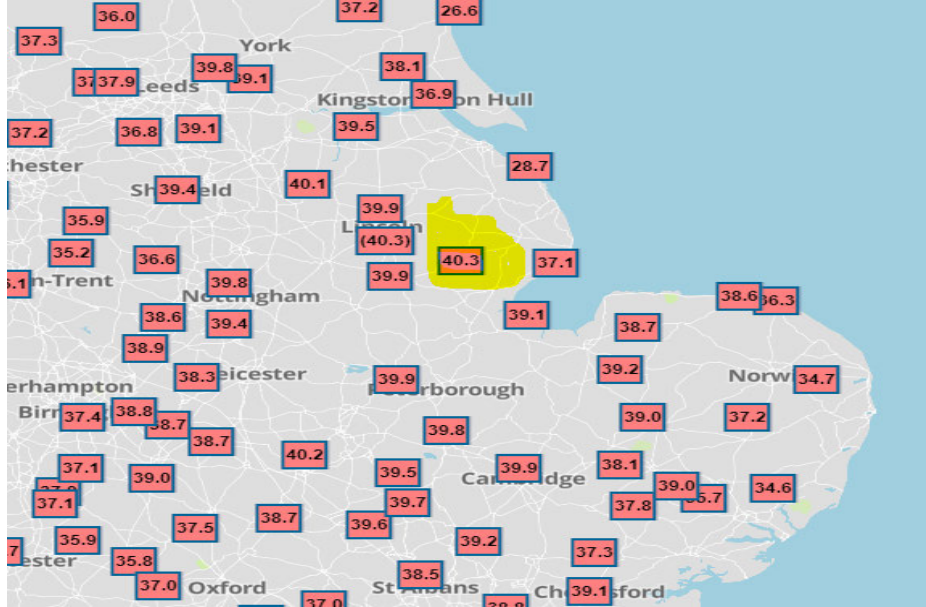
Summary: Coningsby (Lincolnshire)

UK highest Daily max temperature

Occurrence: On the 19th July 2022 a daily maximum temperature of 40.3C was recorded at Coningsby (Lincolnshire)

Verified :

Is the 'occurrence/record' feasible given the general synoptic situation? QM	 High pressure dominates central Europe, feeding a hot southerly airstream over much of the UK. A series of frontal structures bring some relatively cooler air to parts of Northern Ireland and the South-West England in the later stages of the day. The high thickness tropical airmass was predicted to bring temperatures of 40 C or greater in a good number of medium range forecasts, which similar extremes experienced on the continent – as such the scenario was credible to values recorded across the network.
In this synoptic situation is the station concerned one feasible for the 'occurrence/record'? QM	Forecast data provides the context and locations of expected extremes accompanied by the UK's first red extreme Heat warning stretching from London up to Central England. Coningsby being located within the extreme warning area and the forecast higher thickness values for the period.  <i>GM 1000-850 hPa forecast thickness with MSLP</i> The value of 40.3 C recorded at Coningsby has significant support among not only near neighbours but generally within the airmass. <i>Noting that a similar extreme temperature was recorded at Waddington, which is not verified due to the previous identified issue of the predominate surface area within the enclosure having been weed killed, without sufficient recovery to remove uncertainty from the measurement.</i>

		
Quality Management	Previous scores & comments	No recent /historical issues have been identified with the data prior to the event with the site maintaining a high QC record.
	Current comments	Value passed automated Quality Control checks, along with manual verification from both the Real Time Monitoring and Climate QC teams.
Evidence of occurrence/record. QM		

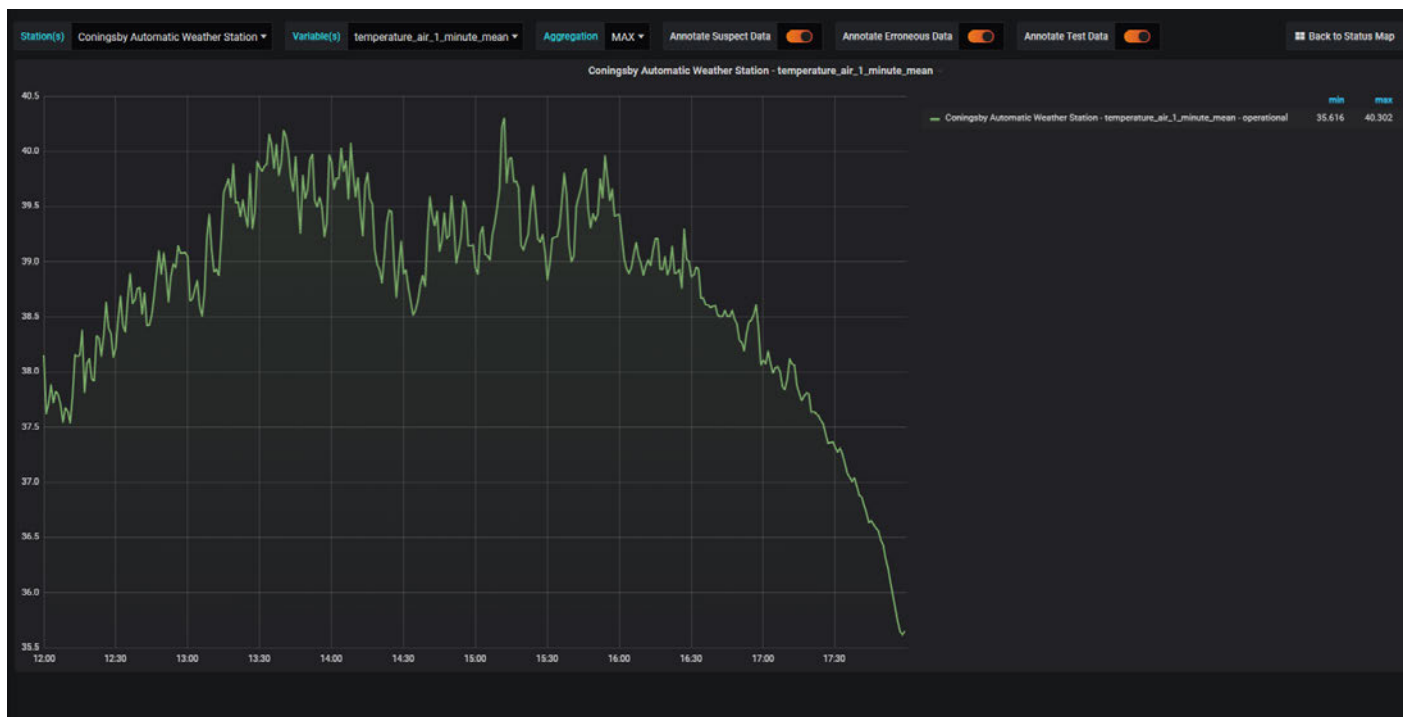
		100m-3 km: 15% See map in annex
	Exposure - comments	The grass had previously been weed killed under the screen but is showing signs of recovery – tufts of grass are present. The grass in the rest of the enclosure was very dry due to a prolonged period of hot dry weather. This is representative of the surrounding area. See exposure calculator and visualisation
Observer Competence RNM		N/A
Last Inspection comments RNM		As above.
Confirmation that the output data / graphs are credible / consistent. QM		As described in the QM section.
Other Comments / and Outcome.		

Conclusion:

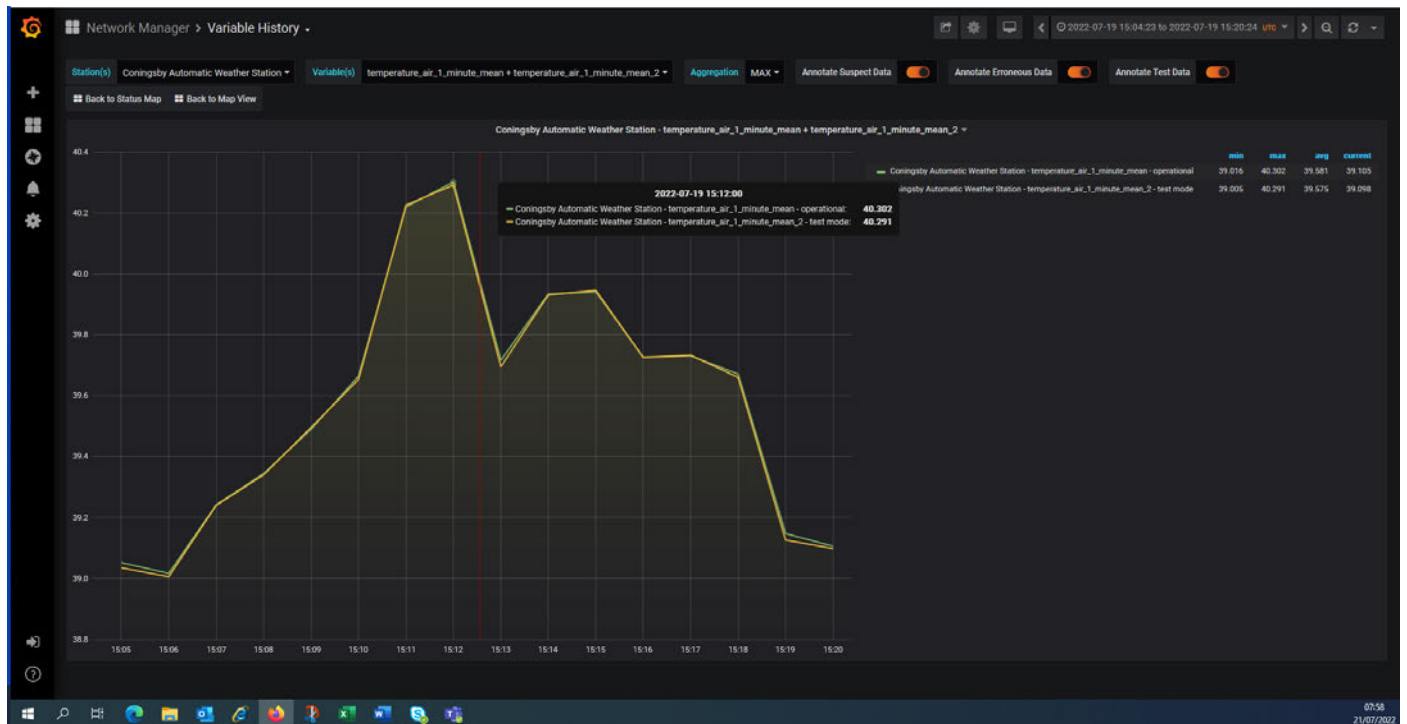
Other Supporting Information

Photographs/Maps/Graphs/Charts/Supporting evidence from Yammer or correspondence

1. Coningsby Surfacenet trace Maximum of 40.3C occurred at 15:12z



Trace of Coningsby DB1 and DB2.



2. Coningsby minute data

STATION	DATE_TIME	ELEM_NAME	ROUND (A_VALUE, 5)
CONINGSBY	19/07/2022 15:00:00.000000	TEMP_AIR	38.94186
CONINGSBY	19/07/2022 15:01:00.000000	TEMP_AIR	38.88913
CONINGSBY	19/07/2022 15:02:00.000000	TEMP_AIR	39.25244
CONINGSBY	19/07/2022 15:03:00.000000	TEMP_AIR	39.31273
CONINGSBY	19/07/2022 15:04:00.000000	TEMP_AIR	39.06771
CONINGSBY	19/07/2022 15:05:00.000000	TEMP_AIR	39.05185
CONINGSBY	19/07/2022 15:06:00.000000	TEMP_AIR	39.01629
CONINGSBY	19/07/2022 15:07:00.000000	TEMP_AIR	39.24147
CONINGSBY	19/07/2022 15:08:00.000000	TEMP_AIR	39.344
CONINGSBY	19/07/2022 15:09:00.000000	TEMP_AIR	39.48915
CONINGSBY	19/07/2022 15:10:00.000000	TEMP_AIR	39.66396
CONINGSBY	19/07/2022 15:11:00.000000	TEMP_AIR	40.21905
CONINGSBY	19/07/2022 15:12:00.000000	TEMP_AIR	40.30185
CONINGSBY	19/07/2022 15:13:00.000000	TEMP_AIR	39.71588
CONINGSBY	19/07/2022 15:14:00.000000	TEMP_AIR	39.93365
CONINGSBY	19/07/2022 15:15:00.000000	TEMP_AIR	39.94085
CONINGSBY	19/07/2022 15:16:00.000000	TEMP_AIR	39.72515
CONINGSBY	19/07/2022 15:17:00.000000	TEMP_AIR	39.73059
CONINGSBY	19/07/2022 15:18:00.000000	TEMP_AIR	39.67056

Quality Assurance Laboratory
 Met Office FitzRoy Road Exeter EX1 3PB United Kingdom
 Tel: [REDACTED] Fax: [REDACTED]



Certificate of Calibration for an Electrical Resistance Thermometer

Met Ref: 21810 **Type:** ERT, Mk4A
Serial No: 118869/19 **Asset No:** SM100731
Cert. No: TE105/21 **Calibrated by:** SW
Date of Test: 14/04/2021
Cal. Due: 13/04/2029

True Temp. (°C)	Resistance (Ω)
-30	88.227
-20	92.165
0	100.011
+30	111.691
+40	115.560

For the Chief Executive, Met Office.

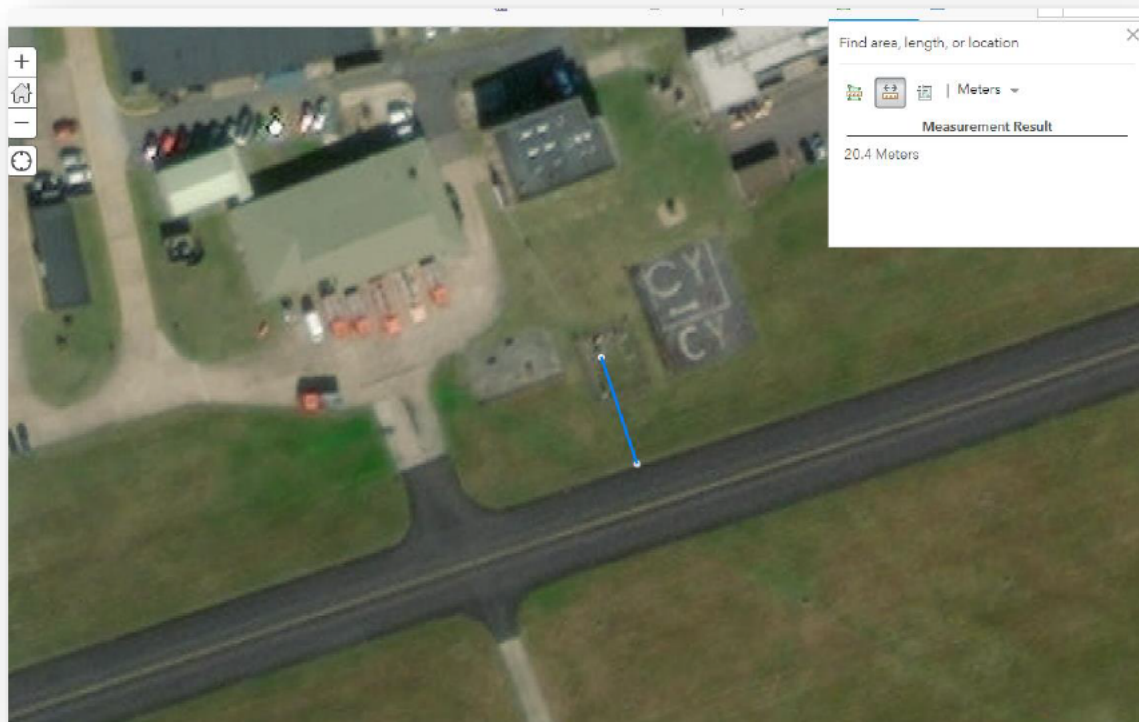
N.B. Please read the notes overleaf.

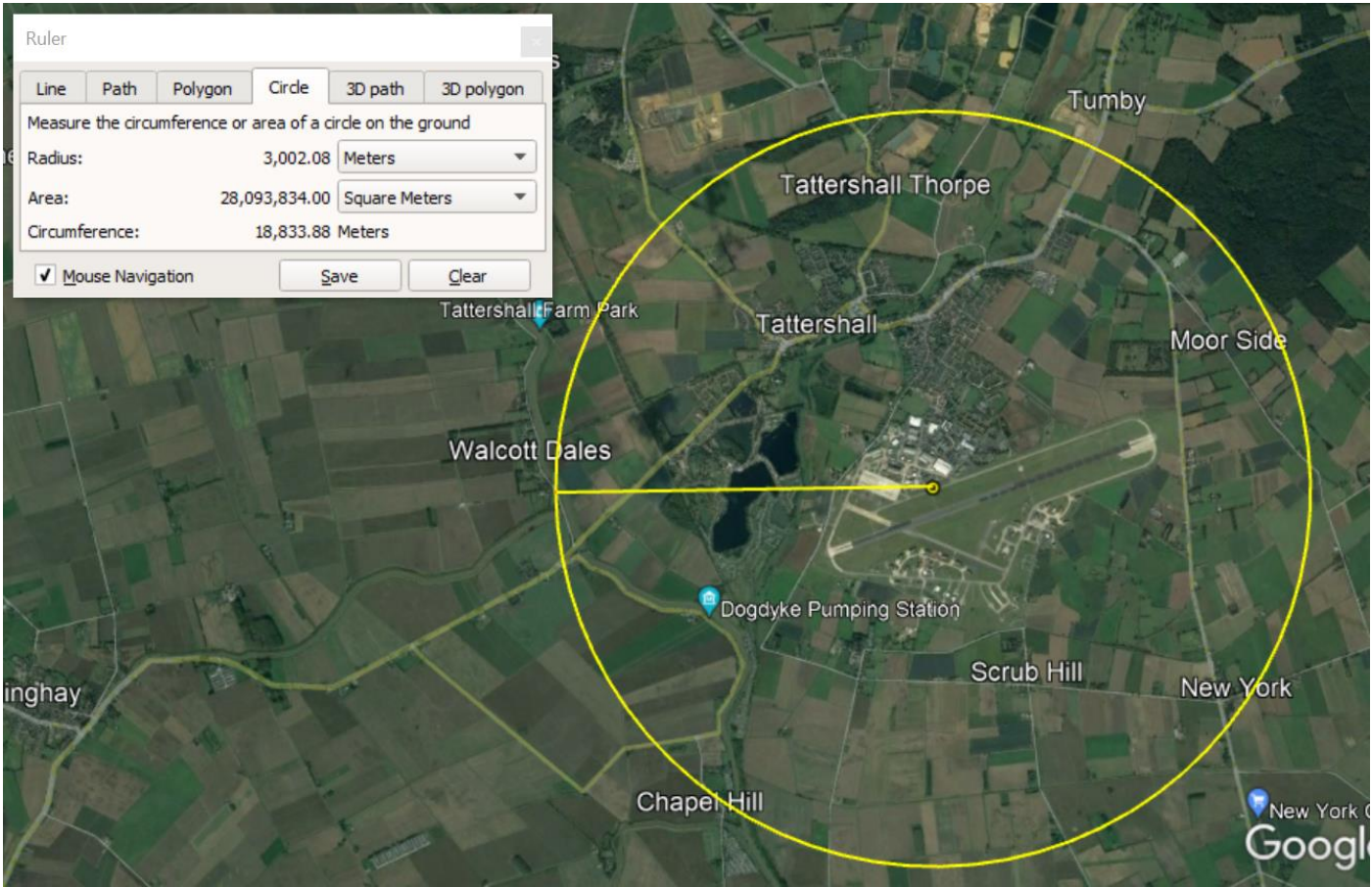
1. All standards and measuring equipment used for this calibration are traceable to the realisation of the units of measurement as made by the National Physical Laboratory.
2. The uncertainty of measurement of the test equipment used is calculated not to exceed $\pm 0.02^\circ\text{C}$.
3. The reported uncertainty is an expanded uncertainty calculated using a coverage factor of $k=2$ which gives a level of confidence of approximately 95%.
4. The uncertainty quoted refers to the measured values only, with no account taken of the instrument's ability to maintain its calibration.
5. The instrument may be unreliable after the re-calibration expiry date.
6. This card should remain with and accompany the instrument at all times.

7. On Site verification results.

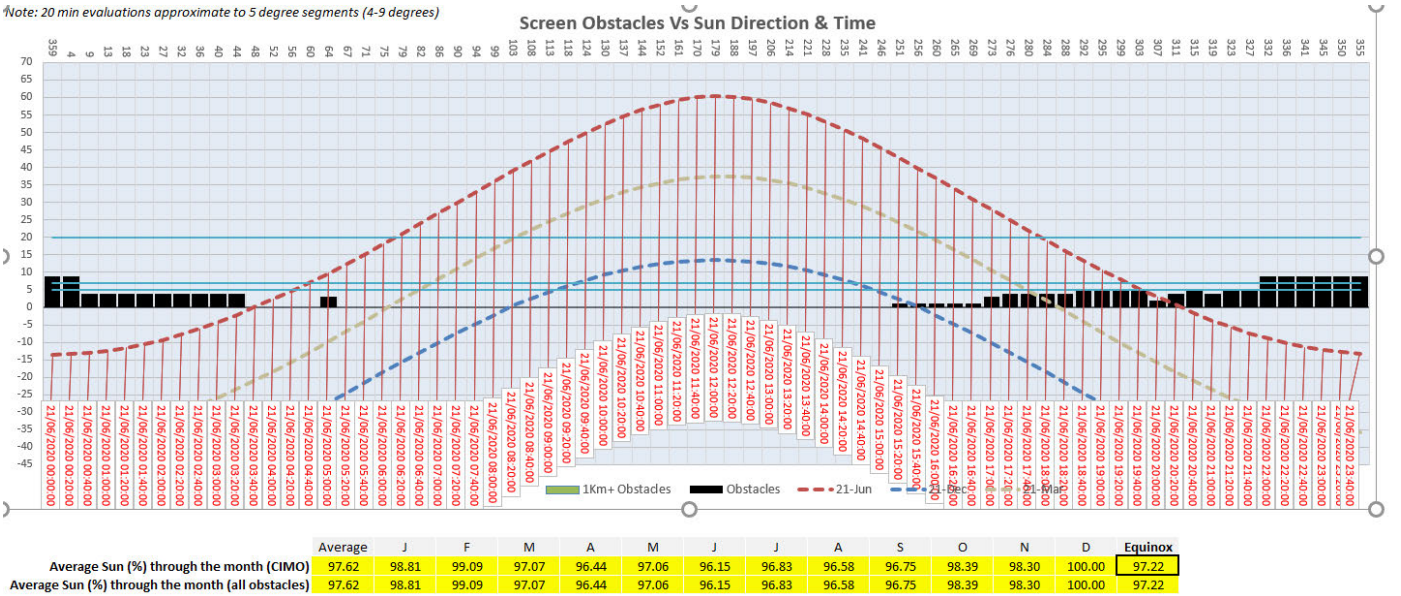
Temperature Verifications			
SM100736			
SM100736	In Use	111.691	
	13/04/2029	100.008	
Coningsby/Coningsby Automatic Weather		92.161	
Met Office Temperature ERT Mk4			
SurfaceNet			
Travelling Standard (TS)	Sensor 1	Sensor 2	
Readings	SM100731	SM100736	
including ins. Cor.	Readings		
1) 0.69	0.59	0.56	
2) 0.79	0.62	0.50	
3) 0.36	0.46	0.45	
Final Aver	0.61	0.53	0.52
Sensor minus TS	0.08	0.09	
Y2.01	Ave without corr.	0.56	0.54
	Resistance @ -25 °C	92.155	92.161
	Resistance @ 0 °C	100.011	100.008
	Resistance @ 30 °C	111.691	111.691

8. Location

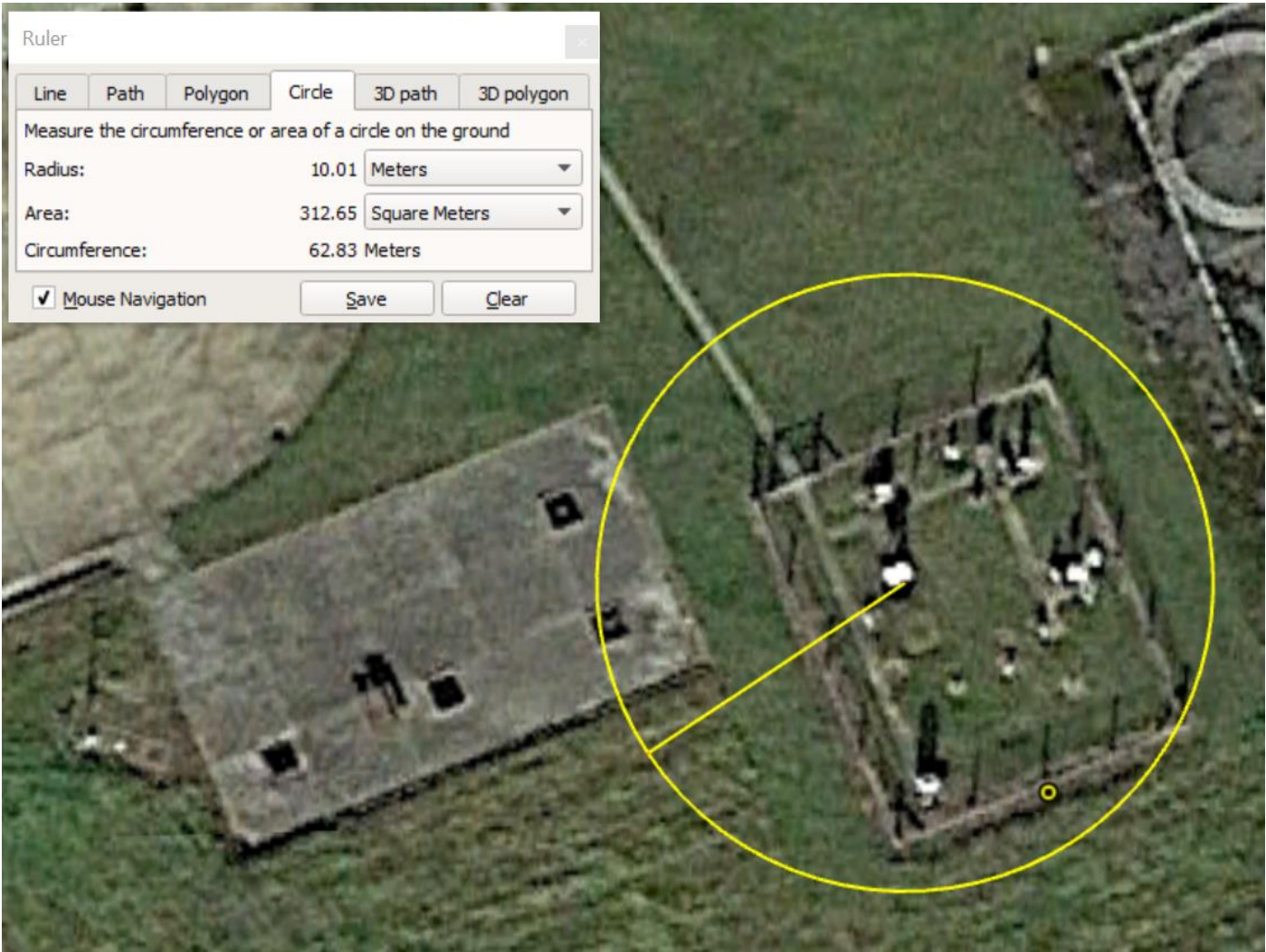




Exposure Calculator Visualisation

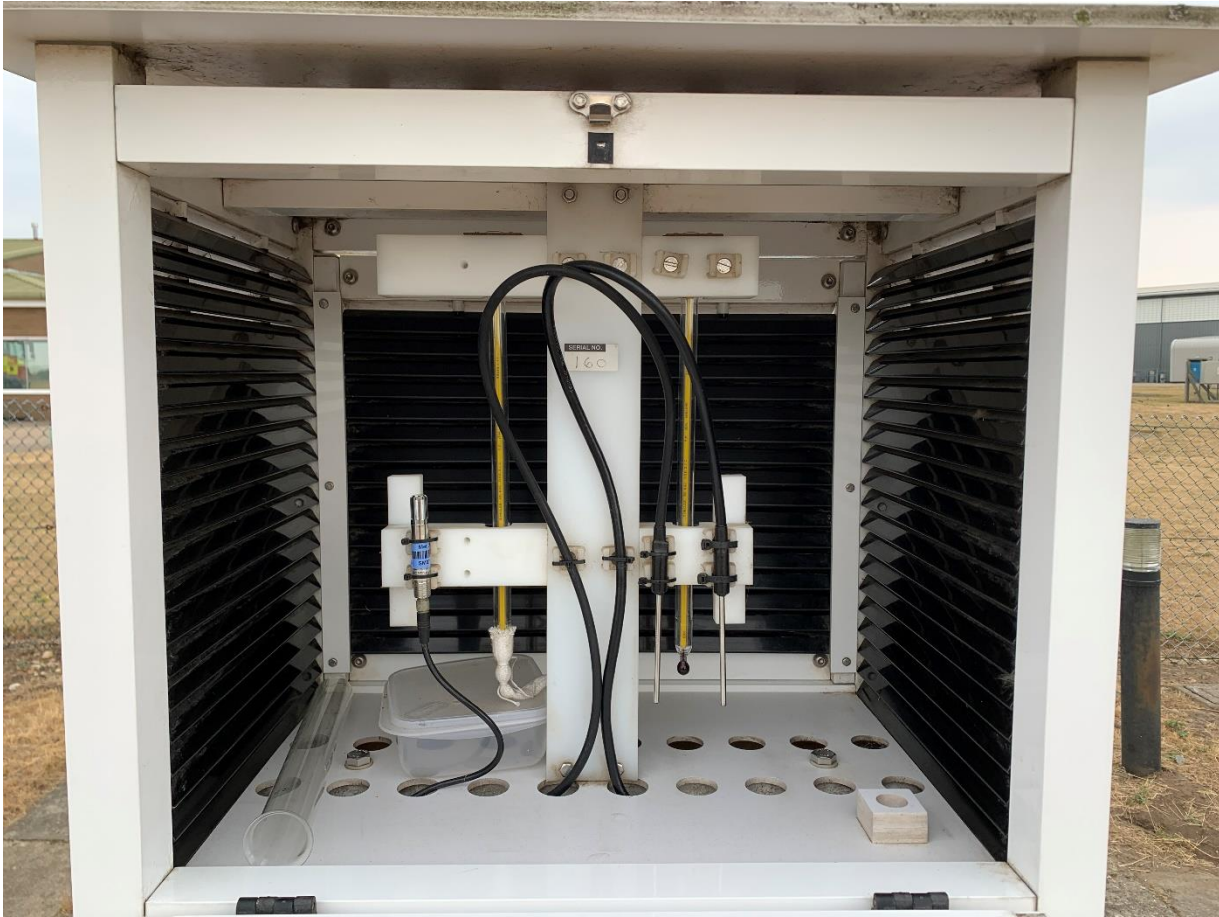


Calculated <10% artificial surfaces within 10m radius:



Flat horizontal ground (<19° slope)	y	Ground covered in low natural vegetation (<10cm). (Assumption of regular maintenance)	y	More than 100m from artificial heat sources, reflective surfaces (buildings, cars, e.t.c) and expanses of water. (≤10% of area within 100m radius, ≤5% within 10-30m or ≤1% within 10m).	N
		Ground covered in low natural vegetation (<25cm)	N	More than 30m from artificial heat sources, reflective surfaces (buildings, cars, e.t.c) and expanses of water. (≤10% of area within 30m radius, ≤5% within 5-10m or ≤1% within 5m).	N
CIMO Class	3			More than 10m from artificial heat sources, reflective surfaces (buildings, cars, e.t.c) and expanses of water. (≤10% of area within 10m radius or ≤5% within 5m).	Y
				Close artificial heat sources, reflective surfaces (buildings, cars, e.t.c) and expanses of water. Occupying ≤50% within a 10m circular area or ≤30% of a 3m circular area.	Y

Pictures courtesy Google





QA Lab Report

Coningsby ERT QA Lab Investigation

On 19th July 2022 the Weather Station at Coningsby recorded the UK's highest ever air temperature reading. In order to ensure that the sensor was working properly it has been returned to the QA Lab to be inspected and recalibrated.

Results

Physical Condition

The ERT (SM100731) was returned to the QA Lab on Monday 26th, on arrival it was visually inspected for any defects and the electrical insulation between the individual wires and the probe case was tested. The probe was found to be in excellent (nearly new) condition and the electrical insulation test results were $>9.0G\Omega$ (an ERT passes inspection if the insulation value is above $100M\Omega$).

Calibration

The ERT was immersed in a stirred calibration bath and tested against one of our SPRT probes at the standard 5 calibration points (-40° , $-20^{\circ}C$, $0^{\circ}C$, $+30^{\circ}C$ and $+40^{\circ}C$). The results were compared to the results found before the unit was deployed in 2021 and are shown in the table below:

Bath Temperature (+/- 0.001°C)	ERT Resistance ohms (14/04/2021)	ERT Resistance ohms (26/07/2022)	Difference ohms
-40.000	88.227	88.228	+0.001
-20.000	92.165	92.167	+0.002
0.000	100.011	100.011	0.000

30.000	111.691	111.690	-0.001
40.000	115.560	115.558	-0.002

*Note a change of 0.001 Ω is approximately equivalent to a change of 0.004°C

Temperature standard

An Isotech 670SQ SPRT, sn:368 was used to carry out the recalibration. It was checked against our Gallium Standard prior to the calibration and an offset of +0.002°C was found, this is well within our calibration uncertainties which are +/-0.02°C at 95% confidence levels.

Conclusion

The probe was found to be in excellent condition and is showing a negligible change in calibration since April 2021. The April 2021 and July 2022 certificates are included on the next page.

© Crown Copyright 2022. Source: Met Office